

What is claimed is:

1. An X-ray microscopic inspection apparatus having X-ray generating means for generating X-rays by allowing an electron beam from an electron source to impinge on a target for X-ray generation, for inspecting an object to be inspected by utilizing said X-ray, the apparatus comprising a magnetic superposition lens having a magnetic field generating portion disposed in the vicinity of an electron generating portion of an electron gun; reflected electron detecting means having a detecting portion disposed above said target for X-ray generation, for detecting a reflected electron from said target; and electron image generating means for performing imaging of a target surface utilizing the signals from said reflected electron detecting means, wherein the apparatus is arranged so that alignment including focus adjustment to said target for X-ray generation and astigmatism correction may be performed based on image information of said electron image.
  
2. An X-ray microscopic inspection apparatus having X-ray generating means for generating X-rays by allowing an electron beam from an electron source to impinge on a target, for inspecting an object to be inspected by utilizing said X-rays, the apparatus comprising a magnetic superposition lens having a magnetic field generating portion disposed in the vicinity of an electron generating portion of an electron gun; and a

scan coil for freely swinging an electron probe formed via said magnetic superposition lens on a surface of said target for X-ray generation.

3. An X-ray microscopic inspection apparatus having X-ray generating means for generating X-rays by allowing an electron beam from an electron source to impinge on a target for X-ray generation, for inspecting an object to be inspected by utilizing said X-rays, the apparatus comprising a magnetic superposition lens having a magnetic field generating portion disposed in the vicinity of an electron generating portion of an electron gun; and an electron beam axis alignment coil disposed in the vicinity of the generating portion of an electron generated from said electron source, for aligning an axis of an electron beam allowed to impinge on said target for X-ray generation via said magnetic superposition lens while accelerating the electron.

4. An X-ray microscopic inspection apparatus having X-ray generating means for generating X-rays by allowing an electron beam from an electron source to impinge on a target, for inspecting an object to be inspected by utilizing said X-rays, the apparatus comprising a magnetic superposition lens having a magnetic field generating portion disposed in the vicinity of an electron generating portion of an electron gun; electron

probe control means for scanning an electron beam; and X-ray CT image generating means for allowing a microstructure of a cross section of interest of said object to be displayed by processing plural sets of images based on data of transmitted X-rays of said object in response to said scanning.

5. An X-ray microscopic inspection apparatus having X-ray generating means for generating X-rays by allowing an electron beam from an electron source to impinge on a target for X-ray generation, for inspecting an object to be inspected by utilizing said X-rays, the apparatus comprising a magnetic superposition lens having a magnetic field generating portion disposed in the vicinity of an electron generating portion of an electron gun; fluorescent X-ray detecting means having a detecting portion disposed above said object and outside an X-ray target for detecting a fluorescent X-ray generated from said object; and elemental analysis means for analyzing elements of said object based on a fluorescent X-ray signals from said fluorescent X-ray detecting means.

6. An X-ray microscopic inspection apparatus having X-ray generating means for generating X-rays by allowing an electron beam from an electron source to impinge on a target for X-ray generation, for inspecting an object to be inspected by utilizing said X-rays, the apparatus comprising a magnetic

superposition lens having a magnetic field generating portion disposed in the vicinity of an electron generating portion of an electron gun; and a plurality of targets for different characteristic X-ray generation having different wavelengths, wherein the apparatus is arranged so that characteristic X-rays of a wavelength of interest may be generated by switching said targets for X-ray generation depending on a purpose of inspection.